Assessment of the changes in the oral health related quality of life 24 hours following insertion of fixed orthodontic appliance components — An observational cross-sectional study conducted at Bahria University Medical and Dental College Karachi

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Abstract
Objective: To evaluate the changes in Oral Health Related Quality of Life 24 hours following insertion of fixed orthodontic appliance components, and to compare the results between different age groups and genders.
Methods: The observational cross-sectional study was conducted from July to December 2017 at Bahria University Medical and Dental College, Karachi, and comprised patients from the Orthodontics outpatient department enrolled via convenience sampling. Oral Health Impact Profile questionnaire was used to assess the Oral Health Related Quality of Life after placement of separators, bands and brackets. Patients were assessed before the appliances were placed and 24 hours after the insertions. Changes were evaluated and age and gender groups were compared using SPSS 17.
Results: Of the 70 patients, 20(28%) were males and 50(72%) were females. The overall mean age of the sample was 18.3±3.8 years. Oral Health Impact Profile scores showed significant deterioration of oral health quality 24 hours after the placement of brackets (p<0.05). However, there was no significant deterioration of lack of self-confidence (p=0.19), avoid smiling (p=0.11) and embarrassment (p=0.62) after the placement of separators and bands. There was no significant difference across genders (p>0.05), but young adults had significantly higher mean difference compared to adolescents after placement of bands (p<0.05).
Conclusion: The Oral Health Related Quality of Life significantly deteriorated 24 hours following the insertion of separators, bands and brackets.
Keywords: OHRQoL, OHIP, Fixed orthodontic treatment, Separators, Bands, Brackets. (JPMA 69: 677; 2019)
higher frequency of psychosocial impact than those wearing removable appliances. Another study\textsuperscript{13} reported that patients wearing fixed appliance had decreased QoL than those who were wearing the Invisalign aligners.

Time is a major factor while studying the effect of orthodontic treatment on QoL.\textsuperscript{17} A study\textsuperscript{13} assessed the QoL impact between subjects treated with Invisalign aligners and those with fixed appliances, and found that the time duration affected the physical, functional and psychological wellbeing of the patient. One study\textsuperscript{11} reported that when compared with pretreatment phase, a patient’s OHRQoL was frequently worsened during treatment. The first month after the insertion of fixed orthodontic appliance reveals the most prominent change in OHRQoL. Mansor et al\textsuperscript{17} reported a deterioration in OHRQoL 24 hours following insertion of fixed orthodontic appliances. This decline affects almost all domains, and such type of information can and should be used for ‘informed consent’ prior to the treatment, which may increase patients’ compliance as they are aware of what is going to happen in the first phase of fixed orthodontic therapy.

Nationally, there is hardly any work on OHRQoL and internationally there are a few very studies evaluating the physical, social and psychological effects of orthodontic treatment and almost none has assessed OHRQoL changes due to the placement of multiple components of fixed orthodontic treatment. Third world countries in general face many more hardships in everyday life compared to the more developed countries and, therefore, there might be a marked difference between the results of such studies carried out in the two settings. The current study was planned to evaluate the changes in OHRQoL 24h following the insertion of different fixed orthodontic appliance components, and to determine age and gender variations in OHRQoL following the insertion of such components.

**Subjects and Methods**

The observational cross-sectional study was conducted at Bahria University Medical and Dental College, Karachi, from July to December 2017, and comprised patients registered for orthodontic treatment at the orthodontic outpatient department (OPD) who were enrolled using convenient consecutive sampling after approval was obtained from the institutional ethics review committee.

The sample size was calculated using GPower 3.1.9.2 by assuming 5% margin of error, 95% confidence interval (CI) for mean, and effect size as 0.4. Those included were healthy individuals with no systemic disease, aged 13-26 years, having a skeletal base pattern of Class I, Class II, or Class III, with mild to severe crowding or spacing in upper and lower arches, intact healthy permanent first molars, on whom no therapeutic intervention was planned with any intra-oral and extra-oral appliances other than fixed appliance therapy. Patients with severe skeletal pattern (Class II or Class III) who required orthognathic surgery, patients in which brass-wire separators were needed to be placed instead of elastic separators, patients who required molar tubes instead of bands, any history of ongoing or previous periodontal disease or bone loss (periodontal pockets >4mm) and syndromic patients were excluded. Informed consent was obtained from all the participants. For patients <18 years, consent was obtained from the parents concerned, but the questionnaire was filled by the patients themselves.

A Malaysian short version of the Oral Health Impact Profile (OHIP-14[M])\textsuperscript{18,19} questionnaire with two additional questions, which is called OHIP-16[M]\textsuperscript{17} was used to assess OHRQoL. Pre-testing of the questionnaire was done to check for face validity. Orthodontists (Associate and Assistant Professors) from different dental colleges checked the face validity of the questionnaire to test the proposed methodology. Results revealed there was no need to change the proposed questionnaire. OHIP-16 measures how a person's oral health condition affects QoL. It includes functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap domains. Responses of each item are made on a Likert scale coded as: 1=never, 2=hardly ever, 3=occasionally, 4=fairly often, and 5=very often. The questionnaire scores range 16-80, where a total of 16 or less indicates no impact, and a score of 80 indicates the worst possible impact on QoL. Individual domain scores are calculated by summing up responses to the items within that particular domain, with higher scores indicating greater impact.

All the procedures were performed by a single calibrated operator to reduce bias. After registering the patients and finalizing their treatment plan, the subjects were briefed about the nature of the study. The questionnaire, which was in English language, was then handed to the subjects to fill.

It was ensured that the questionnaire was completely...
and correctly filled in by all the participants and therefore none of the forms needed to be discarded. Patients completed the first questionnaire, which was used as the baseline (T0), before insertion of the fixed orthodontic appliance components, and they were given the second questionnaire to be completed 24 hours after insertion (T1) of that component. T0 and T1 readings were taken for each separator's bands and brackets. The participants were called after 24 hours to ensure that the questionnaires were duly filled, and the patients returned them on their next visit.

Patients were asked to avoid using analgesics, but if they did, they were asked to mention it on their questionnaire. The patients who used analgesics were excluded from the study.

Elastomeric separators and bands were then placed on all first permanent molars in one visit, whereas second molars were banded later after the data-collection was complete. 0.012"NiTi wire was placed after bonding and secured with elastomeric o-rings. Fixation of all the appliances followed the standard protocol by the manufacturer.

In patients who required extractions for their treatments due to crowding, fixation of the brackets was performed 2 weeks after the extractions to allow complete healing of the wound to prevent any overlapping of pain due to extraction and bonding.

Statistical analysis was done using SPSS 17. The level of significance was set at p<0.05. Initially, descriptive analysis and cross-tabulation was performed to estimate the mean scores along with standard deviations and frequencies and percentages of gender and age. Changes in the OHRQoL between T0 and T1 was evaluated using paired sample t-test. Independent sample t test was used to compare variations of results with age and gender.

**Results**

Of the 70 patients, 20 (28%) were males and 50 (72%) were females. The overall mean age of the sample was 18.3±3.8 years (Table-1).

All OHIP-16 domains had significantly higher values 24 hours after the placement of each of the components (Table-2).

There was significant deterioration of OHRQoL except for embarrassment, lack of self-confidence and in avoiding smile (p>0.05) (Table-3). Subjects avoided going out after the placement of separators and brackets, but this was not significant after the bands were placed (p>0.05).

There was no gender variation in OHRQoL due to the placement of bands and brackets (p>0.05). However, females showed significantly more deterioration of OHRQoL (p<0.05). Age group comparison showed no variation after separators and brackets (p>0.05), but young adults showed significantly more deterioration of OHRQoL after band placement compared to the adolescents (p<0.05) (Table-4).

**Table-1: Demographics of the study sample.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency n (%)</th>
<th>Mean(S.D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>20(28)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50(72)</td>
<td></td>
</tr>
</tbody>
</table>

**Table-2: Mean score OHIP-baseline and 24h following insertion of each domain.**

<table>
<thead>
<tr>
<th>Domain</th>
<th>B.L Mean (S.D)</th>
<th>Separators After 24 HR Mean (S.D)</th>
<th>P</th>
<th>B.L Mean (S.D)</th>
<th>Bands After 24 HR Mean (S.D)</th>
<th>P</th>
<th>B.L Mean (S.D)</th>
<th>Brackets After 24 HR Mean (S.D)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Limitation</td>
<td>4.3(1.4)</td>
<td>9.8(2.8)</td>
<td>&lt;0.001</td>
<td>5.1(2.5)</td>
<td>9.2(3.9)</td>
<td>&lt;0.001</td>
<td>4.8(1.8)</td>
<td>11.3(3.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Pain</td>
<td>2.0(0.3)</td>
<td>4.3(1.3)</td>
<td>&lt;0.001</td>
<td>2.3(0.7)</td>
<td>5.0(2.2)</td>
<td>&lt;0.001</td>
<td>2.4(1.1)</td>
<td>6.1(1.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>2.6(1.1)</td>
<td>4.0(1.7)</td>
<td>&lt;0.001</td>
<td>2.7(1.2)</td>
<td>4.0(1.6)</td>
<td>&lt;0.001</td>
<td>2.5(1.1)</td>
<td>5.2(2.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical disability</td>
<td>2.5(1.0)</td>
<td>4.7(2.1)</td>
<td>&lt;0.001</td>
<td>2.9(1.7)</td>
<td>4.3(1.9)</td>
<td>&lt;0.001</td>
<td>2.4(1.0)</td>
<td>5.4(2.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Psychological Disability</td>
<td>2.0(0.2)</td>
<td>3.6(1.8)</td>
<td>&lt;0.001</td>
<td>2.3(1.1)</td>
<td>3.3(1.9)</td>
<td>&lt;0.001</td>
<td>2.2(0.7)</td>
<td>3.7(1.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Social disability</td>
<td>2.0(0.1)</td>
<td>2.8(1.6)</td>
<td>&lt;0.001</td>
<td>2.1(0.5)</td>
<td>2.7(1.8)</td>
<td>0.004</td>
<td>2.1(0.5)</td>
<td>2.8(1.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Handicap</td>
<td>2.2(0.7)</td>
<td>3.9(1.8)</td>
<td>&lt;0.001</td>
<td>2.3(0.8)</td>
<td>3.8(1.6)</td>
<td>&lt;0.001</td>
<td>2.6(0.9)</td>
<td>5.3(1.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>OHIP</td>
<td>17.9(2.8)</td>
<td>33.4(9.0)</td>
<td>&lt;0.001</td>
<td>20.1(6.0)</td>
<td>32.6(11.4)</td>
<td>&lt;0.001</td>
<td>19.36(5.8)</td>
<td>40.1(10.6)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Results show P-values from paired t-test.
OHIP: Oral Health Impact Profile.
SD: Standard deviation.
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Table-3: Mean score OHIP-16 baseline (BL) and 24h post-fixation for each item.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Items</th>
<th>B.L Mean (S.D)</th>
<th>Separators After 24 HR Mean (S.D)</th>
<th>P</th>
<th>Bands After 24 HR Mean (S.D)</th>
<th>P</th>
<th>Brackets After 24 HR Mean (S.D)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Limitation</td>
<td>Difficulty in chewing</td>
<td>1.0(0.5)</td>
<td>3.4(1.0)</td>
<td>&lt;0.001</td>
<td>1.4(0.9)</td>
<td>2.8(1.3)</td>
<td>&lt;0.001</td>
<td>1.2(0.6)</td>
</tr>
<tr>
<td></td>
<td>Bad Breath</td>
<td>1.0(0.4)</td>
<td>1.3(0.7)</td>
<td>0.003</td>
<td>1.1(0.4)</td>
<td>1.7(1.0)</td>
<td>&lt;0.001</td>
<td>1.1(0.5)</td>
</tr>
<tr>
<td></td>
<td>Difficulty in pronunciation</td>
<td>1.1(0.4)</td>
<td>1.7(1.0)</td>
<td>&lt;0.001</td>
<td>1.1(0.5)</td>
<td>1.8(1.1)</td>
<td>&lt;0.001</td>
<td>1.1(0.5)</td>
</tr>
<tr>
<td></td>
<td>Discomfort in eating</td>
<td>1.1(0.4)</td>
<td>3.3(1.1)</td>
<td>&lt;0.001</td>
<td>1.4(0.8)</td>
<td>2.8(1.3)</td>
<td>&lt;0.001</td>
<td>1.2(0.5)</td>
</tr>
<tr>
<td>Physical Pain</td>
<td>Ulcer</td>
<td>1.0(0.2)</td>
<td>1.2(0.7)</td>
<td>0.10</td>
<td>1.1(0.5)</td>
<td>2.3(1.3)</td>
<td>&lt;0.001</td>
<td>1.2(0.7)</td>
</tr>
<tr>
<td></td>
<td>Pain</td>
<td>1.0(0.2)</td>
<td>3.0(1.2)</td>
<td>&lt;0.001</td>
<td>1.2(0.4)</td>
<td>2.7(1.2)</td>
<td>&lt;0.001</td>
<td>1.2(0.6)</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>Food stagnation b/w teeth</td>
<td>1.2(0.6)</td>
<td>2.5(1.2)</td>
<td>&lt;0.001</td>
<td>1.4(0.9)</td>
<td>2.5(1.3)</td>
<td>&lt;0.001</td>
<td>1.3(0.8)</td>
</tr>
<tr>
<td></td>
<td>Embarrassment</td>
<td>1.4(0.9)</td>
<td>1.4(0.9)</td>
<td>0.62</td>
<td>1.3(0.7)</td>
<td>1.4(1.0)</td>
<td>0.085</td>
<td>1.1(0.5)</td>
</tr>
<tr>
<td>Physical disability</td>
<td>Avoidance of eating certain food</td>
<td>1.0(0.1)</td>
<td>3.0(1.3)</td>
<td>&lt;0.001</td>
<td>1.5(1.0)</td>
<td>2.7(1.3)</td>
<td>&lt;0.001</td>
<td>1.2(0.7)</td>
</tr>
<tr>
<td></td>
<td>Avoid smiling</td>
<td>1.5(1.0)</td>
<td>1.7(1.2)</td>
<td>0.11</td>
<td>1.4(1.0)</td>
<td>1.6(1.1)</td>
<td>0.115</td>
<td>1.2(0.6)</td>
</tr>
<tr>
<td>Psychological Disability</td>
<td>Disturbed sleep</td>
<td>1.0(0.1)</td>
<td>1.7(1.0)</td>
<td>&lt;0.001</td>
<td>1.1(0.4)</td>
<td>1.6(1.0)</td>
<td>&lt;0.001</td>
<td>1.0(0.3)</td>
</tr>
<tr>
<td></td>
<td>Concentration affected</td>
<td>1.0(0.1)</td>
<td>1.8(1.2)</td>
<td>&lt;0.001</td>
<td>1.2(0.8)</td>
<td>1.7(1.2)</td>
<td>&lt;0.001</td>
<td>1.1(0.6)</td>
</tr>
<tr>
<td>Social disability</td>
<td>Avoid going out</td>
<td>1.0(0.1)</td>
<td>1.4(1.0)</td>
<td>0.01</td>
<td>1.0(0.4)</td>
<td>1.3(0.9)</td>
<td>0.23</td>
<td>1.0(0.2)</td>
</tr>
<tr>
<td></td>
<td>Difficulty carrying out daily activities</td>
<td>1.0(0.0)</td>
<td>1.3(0.8)</td>
<td>0.01</td>
<td>1.0(0.2)</td>
<td>1.4(1.0)</td>
<td>0.02</td>
<td>1.1(0.4)</td>
</tr>
<tr>
<td>Handicap</td>
<td>Lack of self confidence</td>
<td>1.1(0.6)</td>
<td>1.3(0.7)</td>
<td>0.19</td>
<td>1.0(0.3)</td>
<td>1.2(0.7)</td>
<td>0.083</td>
<td>1.0(0.2)</td>
</tr>
<tr>
<td></td>
<td>Difficulties in cleaning</td>
<td>1.0(0.3)</td>
<td>2.6(1.4)</td>
<td>&lt;0.001</td>
<td>1.3(0.6)</td>
<td>2.6(1.3)</td>
<td>&lt;0.001</td>
<td>1.5(0.8)</td>
</tr>
</tbody>
</table>

Results show P-values from paired t-test.
OHIP: Oral Health Impact Profile.
SD: Standard deviation.

Table-4: Comparing mean difference of OHIP-16 baseline and 24h following insertion between gender and age groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Separators Mean Differences (SD)</th>
<th>P</th>
<th>Bands Mean Differences (SD)</th>
<th>P</th>
<th>Brackets Mean Differences (SD)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>1.8(1.1)</td>
<td>0.04</td>
<td>1.6(1.2)</td>
<td>0.11</td>
<td>2.2(1.1)</td>
<td>0.7</td>
</tr>
<tr>
<td>Female</td>
<td>50</td>
<td>2.1(1.3)</td>
<td></td>
<td>1.8(1.4)</td>
<td></td>
<td>2.1(1.2)</td>
<td></td>
</tr>
<tr>
<td>Age Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescent</td>
<td>41</td>
<td>2.0(1.3)</td>
<td>0.85</td>
<td>1.5(1.4)</td>
<td>0.01</td>
<td>2.2(1.2)</td>
<td>0.7</td>
</tr>
<tr>
<td>Young adult</td>
<td>29</td>
<td>2.1(1.2)</td>
<td></td>
<td>1.9(1.3)</td>
<td></td>
<td>2.1(1.2)</td>
<td></td>
</tr>
</tbody>
</table>

Results show P-values from independent sample t-test.
OHIP: Oral Health Impact Profile.
SD: Standard deviation.

Discussions
The study was carried out to evaluate OHRQoL changes 24h after the insertion of fixed orthodontic appliance therapy components like separators, bands and brackets. OHRQoL was assessed at 6 steps; before and 24h after the insertion of elastomeric separators, bands and brackets. The mean scores for each domain and item of OHIP-16 was compared at baseline and 24 hours after the fixation of orthodontic appliances.

Interestingly, OHIP-16 scores at T0 were low for all separators, bands and brackets, suggesting that despite having a perceived orthodontic treatment need, the effect of malocclusion on OHRQoL was insignificant. These findings were similar to other studies involving other patient groups. However, a few patients reported embarrassment and lack of self-confidence before the placement of separators due to their malocclusion which had indirect effects on their aesthetics, but the results were statistically insignificant.

In our study, all OHIP-16 domains were significantly higher 24 hours after the insertion of fixed orthodontic appliances, which is in line with another study in which all OHIP-16 domains significantly increased 24h after orthodontic brackets except for the social disability and handicap domains.

Another study found that fixed orthodontic treatment had a negative impact on the OHRQoL of adults during the first 3 months of therapy, with a declining tendency in
scores after 6 months of treatment, and scores returned to the pre-treatment levels only at the end of the treatment.21

The current found that OHIP-16 items were significantly affected 24 hours after the insertion of orthodontic brackets. However, in case of separators and bands, lack of self-confidence, avoid smiling and embarrassment were not significantly affected because patients did not feel that separators and bands affected their appearance compared to the brackets which would easily show when the patients smile as face is the centre of attraction when communicating with people, leading to an increased embarrassment and lack of self-confidence. A study24 concluded that all OHIP-16[M] items were significantly affected except for food stuck in between teeth and avoiding going out. In the current study the participants complained about the food impaction because of being unable to clean the food which got stuck between their teeth, although oral hygiene instructions were given to all the patients in each visit. Participants avoided going out due to the pain and discomfort they perceived 24 hours after the insertion of separators, bands and brackets.

A study21 found OHIP domains most significantly affected were physical pain, psychological discomfort, and physical disability within 1 week after the fixation of the appliances.

Similar but more pronounced results were found in the current study as all the OHIP-16 domains were equally affected 24 hours after the insertion of appliances.

According to a study,4 the psychological discomfort and disability domains contributed most significantly to impact reduction in OHRQoL. Similarly, in our study the psychological disability domain items, such as sleep and concentration, were significantly affected a day after the insertion of the components, which may be because these domains are related to the adaptation period required to cope up with the newly-placed therapeutic components in the oral cavity.

In our study, almost all participants reported pain and discomfort on chewing and eating 24h after the insertions. Other studies with similar results reported a significant increase in the level of discomfort post-intervention at 4 hours and 24 hours which gradually decreased by day 3.22-26

Studies have also stated that the pain and discomfort after wearing fixed appliances starts 2h after the placement of the appliances, reaches its peak intensity at 24h, and decreases progressively over the next 5-7 days.27,28 A study29 reported that pain resulting from orthodontic therapy has pronounced influence on the daily activities of patients. These findings are in accordance with our study where participants reported significantly marked influence in carrying out daily activities 24hours after insertion of separators, bands and brackets among which separators affected the daily activities more than the bands and the brackets.

Patients who used analgesics pre- or post-operatively were excluded from our study because analgesics tend to reduce the pre and post-operative orthodontic pain and could contribute to biased results. Several studies have found that analgesics reduce orthodontic pain. The efficacy of anti-inflammatory drugs such as aspirin and ibuprofen have been evaluated previously.30-33

The participants in our study reported that they had significant disturbances in sleeping after the placement of all the three elements which is due to the quality of sleep affected as a result of newly-placed appliances in the oral cavity. Our results are consistent with other studies28 that reported a diurnal variation due to increase in perceived pain in evenings and night time. On the other hand, another study34 found no significant effects on the sleep quality of patients wearing orthodontic appliances with those who were not wearing them.

Most of the patients in our study reported frequent ulceration which followed the procedures. This is due to the mechanical trauma of the oral tissues caused by fixed orthodontic appliances. These results related with a study35 which reported that 47% of the patients complained of frequent ulceration during fixed orthodontic treatment.

We found that females had significantly higher mean difference in OHRQoL 24h after the procedures compared to males. These results are similar to other studies.17,36,37

Our study showed no significant mean differences in OHRQoL between males and females, which is in accordance with other studies.23,24,26

No significant mean difference was found between the two age groups in our study. However, young adults had significantly higher mean difference following insertion of bands compared to the adolescents. Literature25,30,38 has reported that younger patients perceived pain significantly less frequently than the elder patients. However, one study27 found that age did not have significant impact on the discomfort level in patients undergoing orthodontic treatment.

The present study has limitations that should be...
addressed. Sample size was relatively small, and, hence, interpretation of the results has to be done with caution. A bigger sample size could have provided a more detailed information regarding the impact of orthodontic treatment on patients' OHRQoL. Secondly, the sample was collected from the orthodontics department of a single institution. A multi-centre study may have produced diverse results. Also, this was done by a single practitioner, so no comments can be made on technique variations. The follow-up period was only 24h for each component of the fixed appliance therapy. A longer follow-up should be observed in future studies. As the second questionnaire was filled after 24h, we could not find out if the pain was more severe before 24h, at 24h or after that. It is quite possible that the variability in options which need to be selected in OHRQoL might have caused difficulties for participants in choosing one of them. However, the instrument used in the study has had its validity demonstrated in several countries.17,18,39-43 Future studies should aim at minimizing these limitations and should also evaluate the association between clinical parameters and OHRQoL.

Conclusions
OHRQoL significantly deteriorated 24 hours after the insertion of separators, bands and brackets placed for fixed orthodontic treatment. There was no significant gender variation in quality of oral health deterioration for bands and brackets, but males showed better toleration for separator placement. There was not significant age variation in tolerating separators and brackets, but the adolescents showed better oral health quality after band placement compared to the young adults.

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References


